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EXAMINER	
ARTMAN, THOMAS R	
ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 11/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/767,024	ENGLER ET AL.	
	Examiner	Art Unit	
	Thomas R. Artman	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *20-31* is/are allowed.

6)☒ Claim(s) *1-3,5-7,9-15,18 and 19* is/are rejected.

7)☒ Claim(s) *4,8,16 and 17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *14 January 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *23 March 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 10 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 10 depends from dependent claim 9, which recites that the detector is an ionization chamber. Claim 10 requires that the detector is a silicon diode detector. These types of detectors are different. Therefore, claim 10 does not further limit claim 9 since it replaces one type of detector with another type.

For the purposes of expediting prosecution, it will be assumed that claim 10 should be dependent upon claim 1.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 5-7, 9, 12, 13, 15, 18, 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Sofield (US 5,621,214).

Regarding claim 1, Sofield discloses a radiation field detection system, including:

a) a radiation detector 106,

b) a positioning mechanism 130, 132 connected to the radiation detector and configured to physically move the radiation detector,

c) a processor 114 coupled to the positioning mechanism and to the radiation detector, where the processor performs the following functions:

d) actuate the positioning mechanism to move the radiation detector to desired locations within a radiation field produced by the radiating device (col.6, lines 38-58),

e) analyze radiation strength indicia from the radiation detector (col.10, lines 5-13),

f) correlate positions of the radiation detector with corresponding amounts of received radiation (col.10, lines 5-13),

g) determine a first location of maximum detected radiation (col.9, lines 10-37), and

h) determine a first relationship between the first location of maximum detected radiation and a second location of maximum radiation (from reference detector, col.9, lines 10-37).

With respect to claim 2, Sofield further discloses that the processor has an output port that is coupled to a controller 116 that determines an excitation arrangement for the radiating device, where the processor provides an indication of the first relationship from an output port 117 to the controller (also see: col.8, lines 43-63).

With respect to claim 3, Sofield further discloses that the second location of maximum detected radiation is an expected location of maximum radiation (col.9, lines 22-25).

With respect to claim 5, Sofield further discloses that the processor determines a second relationship between a first magnitude of maximum detected radiation and a second magnitude of maximum radiation (col.9, lines 22-36).

With respect to claim 6, Sofield further discloses that the processor has an output port that is coupled to a controller 116 that determines an excitation arrangement for the radiating device, where the processor provides an indication of the second relationship from an output port 117 to the controller (also see: col.8, lines 43-63).

With respect to claim 7, Sofield further discloses that the second magnitude of maximum radiation is an expected magnitude of maximum radiation (col.9, lines 22-36).

With respect to claim 7, Sofield further discloses that the second magnitude of maximum radiation is a determined magnitude of maximum radiation detected under a second radiation condition that is different than the first radiation condition of which the first magnitude and location of maximum radiation was measured (col.9, lines 22-36).

With respect to claim 9, Sofield further discloses that the radiation detector is an ionization chamber (col.7, lines 13-15).

Regarding claim 12, Sofield discloses a radiation field detection system, including (see also Abstract):

a) an ionization chamber radiation detector 106 that provides real time radiation strength indicia of amounts of radiation received,

b) a positioning mechanism 130, 132 connected to the radiation detector in order to move the radiation detector, and

c) a processor 114 coupled to the positioning mechanism and to the radiation detector, where the processor performs the following functions:

d) actuate the positioning mechanism to move the radiation detector to a desired location within a radiation field produced by the radiating device (col.6, lines 38-58),

e) analyze radiation strength indicia from the radiation detector in real time (col.10, lines 5-13),

f) correlate positions of the radiation detector with corresponding amounts of received radiation in real time (col.10, lines 5-13), and

g) determine a location of maximum detected radiation in real time (col.9, lines 10-37).

With respect to claim 13, Sofield further discloses that the processor correlates the positions of the radiation detector with corresponding amounts of detected radiation as such information becomes available (col.10, lines 5-13).

With respect to claim 15, Sofield further discloses that the processor has an output port that is coupled to a controller 116 that determines an excitation arrangement for the radiating device, where the processor provides an indication of the location of the maximum detected radiation from an output port 117 to the controller (also see: col.8, lines 43-63).

With respect to claim 18, Sofield further discloses that the processor actuates the positioning mechanism to initially move the radiation detector to an expected maximum radiation location of a linear accelerator beam (col.7, lines 45-49).

With respect to claim 19, Sofield further discloses that the processor actuates the positioning mechanism to move the radiation detector based on a radiation strength previously detected by the radiation detector (the detector detects radiation, then moves on to the next position).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sofield, as applied to claims 1 and 12 above, respectfully, in view of Swinehart (US 4,163,240).

Sofield does not specifically disclose the use of a silicon diode detector, particularly one having a detection volume of less than about 0.2 mm^3.

Swinehart specifically teaches the use of a silicon diode radiation detector (dosimeter) for efficient and sensitive detection of radiation (col.2, lines 46-52). Furthermore, given the parameters of col.4, lines 42-59, using the smallest depth d of 30 mils (0.001 inches) and the largest diameter $2r = d$, one can calculate a detection volume of 0.347 mm^3 (also need conversion factor of 2.54 cm/inch, or 25.4 mm/inch). Granted, this is higher than the claimed volume. However, as stated in lines 57-59, it is essential to the teachings of Swinehart that $2r < d$. Therefore, smaller volumes are contemplated: for example, $2r = \frac{3}{4} d$, then the detection volume is 0.195 mm^3.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Sofield to use the small, efficient and sensitive silicon diode detector of Swinehart for acquiring accurate and efficient dose measurements, as taught by Swinehart.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sofield, as applied against claim 1 above, in view of Ritt (US 6,675,116 B1).

Sofield does not specifically disclose that the radiation detector is moved by the positioning system in three dimensions. Sofield moves the detector in a single 2-D plane.

Ritt specifically teaches the practice of moving a detector in three dimensions in order to quickly and accurately characterize the output of a linear accelerator (col.7, lines 3-11).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Sofield to move the radiation detector in three dimensions in order to more quickly and accurately characterize the output of the linear accelerator as taught by Ritt.

Allowable Subject Matter

Claims 20-31 are allowed.

Claims 4, 8, 16 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record teaches the use of linear accelerators; however, there is no teaching or reasonable suggestion for the additional limitation that the second radiation condition is a different angle of applied radiation, as required by each of claims 4 and 8.

The prior art of record neither teaches nor reasonably suggests the additional limitation a revised excitation plan is determined based upon the implemented excitation plan, the determined location of maximum detected radiation, and an expected location of maximum detected radiation, as required by claim 16.

Claim 17 is objected to by virtue of its dependency.

The prior art of record neither teaches nor reasonably suggests a method where radiation is applied according to a first excitation plan, and where a second excitation plan is determined based upon a relationship between a first position of maximum detected radiation and a second location of maximum radiation, where the first position of maximum detected radiation is determined from a detector that is moved 3 dimensionally in the radiation field of the first excitation plan, where radiation strength is recorded for locations within the radiation field, as required by the combination as claimed in claim 20.

Claims 21-27 are allowed by virtue of their dependency.

The prior art of record neither teaches nor reasonably suggests a radiation field detection system where a processor actuates a positioning system to move a detector within a radiation field and change the orientation of the detector at a position within the radiation field such that the radiation strength is measured at each detector orientation in order to determine a desired orientation of the detector that reduces artifacts, as required by the combination as claimed in claim 28.

Claims 29-31 are allowed by virtue of their dependency.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Navarro (US 6,225,622 B1) teaches a linear accelerator calibration device and method similar to that of Sofield.

Swerdloff (US 5,661,773), Feichtner (US 5,430,308) and Renner (US 6,853,702 B2) teach the use of x-ray films (or stacks thereof) for radiation treatment plan verification.

Ghelmansarai (US 6,783,275 B2) teaches radiation treatment plan verification by comparison of visible light portal imaging.

Mackie (US 6,345,114 B1) teaches the practice of comparing portal images for radiation treatment verification.

Hughes (US 5,754,622) and Hughes (US 2003/0174808 A1) teach the use of real-time radiation treatment plan measurement and verification.

Eickel (US 4,147,936) teaches the practice of keeping a planar detector perpendicular to the incident x-ray beam in x-ray tomography.

Franke (US 6,546,070 B1) teaches the practice of having an ionization chamber's longitudinal axis be parallel to an incident x-ray beam.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas R. Artman whose telephone number is (571) 272-2485. The examiner can normally be reached on 9am - 5:30pm Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Thomas R. Artman
Patent Examiner

Craig E. Church
Primary Examiner